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USSR Report

ENERGY

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OIL AND GAS

OIL, GAS INDUSTRY PROGRAM FOR TECHNICAL PROGRESS REVIEWED

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 2, Feb 84 pp 1-5

[Article: "Technical Progress: The Sectorial Program for Acceleration"]

> [Text] ...we are committed to constant and persistent concern for accelerating scientific-technical progress.... A great deal will depend on how we mobilize the collectives of enterprises, scientific-research and design organizations and engineering-technical and scientific personnel for the acceleration of scientific-technical progress. This task is of paramount importance.
>
> From the text of the speech by General Secretary of the CPSU Central Committee, Chairman of the Presidium of the USSR Supreme Soviet Yu.V. Andropov, at the December (1983) CPSU Central Committee Plenum.

The CPSU Central Committee and the USSR Council of Ministers are paying great attention to scientific-technical progress in our country. Due to the achievements of domestic science, the fruitful labor of the workers and engineering-technical personnel and the introduction of new technology, machines and mechanisms, the socialist economic system is developing at dynamic rates in accordance with the historic outlines of the 26th Party Congress.

Particular attention is being paid to developing the gas industry--one of the key sectors of today's fuel and energy complex. The high developmental rates of the gas industry have been reflected accordingly in the USSR Energy Program adopted by the CPSU Central Committee.

Wide-scale work on exploration and organization of oil and gas extraction on the continental shelf of the USSR seas has begun.

The Ministry of the Gas Industry fulfilled ahead of schedule the plan for three years of the 11th Five-Year Plan due to the introduction of new, advanced technical-economic decisions in the extraction, refining and transport of gas, as well as through its own machine building.

The results achieved, however, still cannot satisfy the ever-growing requirements for development of the gas industry.

To fulfill the resolutions of the CPSU Central Committee and the USSR Council of Ministers on accelerating scientific-technical progress, new methods must be worked out to master the scientific problems and make a fundamental review of the systems of scientific-research and experimental design work, to improve cooperation with related ministries and other organizations taking part in the development of the gas industry, to accelerate introduction of new developments, machines, mechanisms and industrial processes in production and to achieve further improvement in the scientific-research and planning aspect.

There should be a fundamental improvement in training and raising the skills of the workers and engineering personnel, including the personnel of the planning organizations, through directing the training programs toward the newest achievements of domestic and world science and advanced experience, more clearly defined specialization of instruction and developing and putting training equipment into practice and improving the system of regular testing of skills.

The board of the Ministry of the Gas Industry examined and approved the plan, prepared by the divisions and administrations of the central organization with the participation of scientific-research and planning and design organizations and industrial and production enterprises of the sector, for priority organizational measures during the period 1984-1985, directed toward ensuring the fulfillment of the decree of the CPSU Central Committee and the USSR Council of Ministers "On Measures To Accelerate Scientific-Technical Progress in the National Economy."

Published below is a condensation of this document.

Improve the organization of scientific research and experimental design work and raise the efficiency and quality of scientific developments

On the basis of clear-cut organization of the system of research and experimental design and raising the level of scientific results, the following measures have been set forth: Reequipment of the sector's scientific research institutes with laboratory equipment, instruments and computers and forming the instructional materials to convert scientific research organizations to payment for fully completed works, accepted by the buyer; development of creative cooperation between the scientific-technical centers of the sector (All-Union Scientific Research Industry of Natural Gas, All-Union Scientific Research and Planning Institute for Offshore Oil and Gas) and organizations of the USSR Academy of Sciences, its Siberian section and the Moscow Institute of the Petrochemical and Gas Industry imeni Academician I.M. Gubkin; development, in conjunction with the concerned related sectors, of new programs, providing for a rise in the level of extraction and recovery of gas condensate; construction of gas and oil pipelines with heightened reliability, optimum with respect to productivity and pressure; ensuring an increase in extracting oil and condensate on the country's continental shelf.

The growth of efficiency and quality of scientific developments and acceleration of scientific progress will be furthered by the effect of the provision reviewed on material incentive for scientific work by the sector's personnel. Special sessions of the Board of the Ministry of the Gas Industry will be devoted to solving key organizational problems and organizing scientific research.

Improve the organization of introducing new equipment and further technical reequipping of the gas industry.

Decisive conditions for ensuring firm plan discipline to introduce new equipment and advanced technology have been included in balancing out the plans with the material-technical resources allotted.

Revising the provision on the procedure for planning introduction of advanced innovations is subject to fulfillment of these conditions. The priority measures of the plan stipulate yearly express information service from the industrial and production associations on the most important scientific developments completed and recommended for introduction.

A system of regular monitoring of the fulfillment of the plans to introduce new equipment has been assigned to play a special stimulating role; going to the local representative of the central organization, quarterly examination of the state of affairs at the conferences among the directors of the ministry, all-union production associations and production associations and analysis of the fulfillment of the most important solutions, in combination with related sectors, to the problems of technical reequipment of the gas industry.

A comparative analysis of the technical-economic indicators of the basic types of output of the related sectors with the best foreign models will contribute to work on further ensuring of a rise in the technical level of the domestic equipment produced.

Improve standardization, metrology and product quality

The measures of the plan to accelerate scientific-technical progress in the sector pose a number of problems for the central organization divisions and the scientific and production subdivisions of the Ministry of the Gas Industry and their solution will make possible a reduction in the time for the new item to operate in production and a rise in the quality of its manufacture. For this there will be a review of the sectorial documents: OST [All-Union Standard] 51.67-80, "Certification of Industrial Products. Procedure for Certifying in the Ministry of the Gas Industry for Three Quality Categories" and OST 51.57-79, "The System for Developing and Placing Products for Production. Products of the Gas Industry."

A program will be developed for comprehensive standardization of "Natural Gas," ensuring that interrelated requirements for technical-economic indicators for machines, equipment, instruments, materials and equipping items supplied for the needs of the gas industry will be established in the standards.

An analysis is to be made of the state of comprehensive product quality control systems [KS UKP] at the sector's machine building plants, following which specific measures will be taken to increase the functioning efficiency of these systems.

It is planned to introduce supplements to the standards and technical conditions for the output in the form of differentiated norms for indicators characterizing the high and first category quality.

Work will be done to improve the standards and technical conditions with the aim of increasing reliability and economy and reducing the material intensiveness of the output for objects of the gas industry, and a number of certifications of items with respect to highest quality categories will be reviewed.

Revealing obsolete types of products and affirming their new replacements will be an important measure on the way to technical reequipment of the sector.

> Ensure the further growth of efficiency in the economic system and be the chief support in raising the level of economic operations and accelerating scientific-technical progress....
>
> From the decree of the CPSU Central Committee Plenum "On Projects of the State Plan for Economic and Social Development of the USSR and the USSR State Budget for 1984"

> Strengthen the experimental base and establish trial and industrial trial projects to test new types of pipes and equipment for the gas industry.

In order to carry out comprehensive research and tests of equipment, materials, systems and quality control instruments, as well as of industrial processes for operation and repair of main gas pipelines, construction of the following is outlined: in Tyumen Oblast, a proving ground to study corrosion processes, select the protection criterion and for accelerated research on new methods and devices to protect northern gas pipelines against corrosion; a proving ground in Volgograd Oblast to test repaired machines and equipment; a proving ground in Donetsk Oblast for on-the-spot testing of pipes to the point of breakdown; an experimental testing complex in Kursk Oblast, designed for the research, finishing, preliminary, certifying and operating life tests of gas-pumping assemblies, steam and gas units, systems for providing transport of gas, pipes, industrial equipment and also for training highly skilled personnel; a gas-pumping assembly testing stand in Syserti with a gas turbine drive having a capacity of 25 megawatts.

To test GPA [gas pumping assemblies] on a modern technical level, using computers at experimental pumping stations, an automated information measuring system is planned to be put into operation in Novgorod.

Priority scientific research work is planned to determine the hydraulic and reliability characteristics of gas pipelines made of multi-layer and double-layer spiral pipes at an experimental section in the region of the Novokazymskaya Compressor Station, the organization of the test verification of the stress-deformation state of compressor station connections using GTN-25 assemblies, research on the longitudinal stability of the linear sections of a system of gas pipelines under operation at the Uraltransgas Production Association, research on methods of ballasting pipes using nonwoven synthetic materials, precast reinforced concrete and slag-lite loads, tie bolts of various types, etc. at gas pipeline sections 1420 millimeters in diameter in the north of Tyumen Oblast.

Part of the section of the plan for priority measures to accelerate scientific-technical progress is related to the task of setting up a program for constructing experimental plants, production facilities, shops, experimental sections and testing stands for the future.

With a view to prompt adoption of measures to put into operation the priority testing and experimental plants, production facilities, shops, sections, units, stands and bases, beginning from the second half of 1984 automated processing of operational information on the course of erecting the objects for the construction headquarters monitoring this work is to be organized.

Priority Organizational Measures in the Basic Subsectors of the Gas Industry

In drilling gas and gas condensate wells, in order to increase the efficiency of the drilling work and improve the structure of drilling management, the plan specifies the introduction of measures for the following advanced technical and technological and organizational innovations.

All the drilling rigs of the Tyumengazprom Association are to be converted to the capacity system with blocks for cleaning the wash fluid and optimum methods of dragging the boreholes within the limits of the cluster and of the entire Urengoy deposit.

Drilling out Senoman and lower Cretaceous deposits of the Urengoy, Yen-Yakhinskoye, Severo-Urengoyskoye and Yamburgskoye deposits through enlarged clusters with slant-directional wells for an optimum structure of 324 X 245 X 168 millimeters is to be organized.

Scientifically substantiated techniques for opening up and developing productive horizons of the Astrakhanskoye and Karachaganakskoye GKM [gas condensate deposits] are to be developed and utilized.

Production management and structure of the sector's drilling enterprises are to be improved on the basis of a set of scientific developments of SevKavNIIgaz.

Highly effective bits with efficient design of the bottom-hole assembly of the drill string and techniques and procedures for economy turbine drilling are to be used.

A program of computer calculation of technical parameters for trouble-free balanced drilling in deposits inclined toward absorption and gas shows, and a number of other measures are to be introduced by Ukrgazprom.

Extraction and Processing of Gas and Gas Condensate

A gas-cooling unit with ATP5-8/1 assemblies with electric drive and the TKAP-6.3/10, with air drive are to be put into test-industrial operation at the Urengoy-Uzhgorod gas pipeline.

In conjunction with the Ministry of Chemical and Petroleum Machine Building, the development and manufacture of a test model of a highly efficient horizontal cassette absorber with a productivity of 10 million cubic meters a day is to be ensured.

Batches of turbine expansion engine assemblies BTDA 10-13 UKhL-4 to equip the gas cooling stations of the Yamburgskoye deposit are to be readied.

In conjunction with organizations of the Ministry of Power Machine Building and the Ministry of the Ship Building Industry, a test model of a separation gas pumping unit with a power of 10 megawatts in a hydrogen sulfide resistant version is to be developed for the Orenburg GKM.

An industrial batch of flame devices for wells of the Astrakhanskiy GKM, ensuring minimum ejection of hydrogen sulfide into the atmosphere during emergency gas combustion is to be prepared.

Planning documentation for experimental-industrial production of polymeric sulfur is to be developed at the Astrakhanskiy Gas Complex.

An industrial line to clean gas of hydrogen sulfide using zeolites, in a volume of 4 billion cubic meters of gas a year is to be developed at the Shurtanskoye deposit.

Pumping dry natural gas into the bed with a cycling process is to be ensured at the Novotroitskoye gas condensate deposit in a volume of 200 million cubic meters a year.

Mainline Transport and Underground Storage of Gas

Introduction of standard planning designs of unified complete block compressor stations is to be begun.

Wide-scale introduction of new high-efficiency gas pumping assemblies with gas turbine drive (GTN-25 and GTN-16), emergency drive (GPA-Ts-16) and marine drive (GPU-10) is to be implemented.

A gas pumping assembly with gas turbine drive GTN-25 for a pressure of 10 MPa is to be mounted on a test stand in Novgorod.

Acceptance tests of a gas pumping assembly with emergency drive having a power of 16 megawatts (GPA-Ts-16) for a pressure of 10 MPa are to be made.

In conjunction with organizations of the Ministry of Power Machine Building, the USSR Ministry of Power and Electrification is to develop experimental-industrial steam-gas units to obtain electric energy.

In conjunction with organizations of the Ministry of Power Machine Building, a new high-efficiency (efficiency 32%) gas pumping assembly with a power of 25 megawatts is to be developed and its readying for work at the test stand in Syserti is to be set up.

Supply is to be ensured of complete-block compressor stations with emergency drive assemblies and assemblies with marine drive as a unit with equipment for cleaning and cooling gas, preparing fuel, start-up and impulse gas, accepting and launching scrubbing units, crane assemblies and industrial connections.

Development and manufacture of a test model of an electric drive gas pumping assembly with a power of 25 megawatts, with the productivity of the force pump regulated by a revolving guide apparatus is to be ensured jointly with organizations of the Ministry of Power Machine Building and the Ministry of Electrical Equipment Industry.

An experimental section made of multi-layer pipes 1420 millimeters in diameter, 300 kilometers long, for a pressure of 10 MPa is to be put into operation.

Scientific-research and experimental work is to be begun on a test section made of multi-layer pipes 1420 millimeters in diameter, 300 kilometers long for a pressure of 10 MPa.

Pipes 1220-1420 millimeters in diameter with plant exterior insulation from the production facilities of the Khartsyzskiy and Volzhskiy pipe plants are to be introduced.

Experimental-industrial operation of the first models of the Styk and Styk-2 units for automated welding with powder wire are to be implemented and their introduction in capital repair of main gas pipelines, compressor and pumping stations ensured.

Output of a test batch o specialized units for air-plasma pipe cutting, ARS-31 is to be organized at the sector's enterprises and their introduction in capital repair of main gas pipelines ensured.

The Sphere of Comprehensive Automation and Introduction of ASU [Automated Control Systems]

The first sections of an automated planning system for main gas pipelines (Giprospetsgaz) and automated planning of gas extraction projects

(VNIPIgazdobycha [All-Union Scientific Research and Planning Institute of Gas Extraction]) are to be introduced, invariant subsystems and components must be put into operation in the planning organizations of the Ministry of the Gas Industry, and the level of planning work automation is to be brought to 16.5 percent.

An automated scientific research system is to be introduced in the sphere of extraction and transport of natural gas (VNIIgaz [All-Union Scientific Research Institute of the Gas Industry]).

An ASU TP [automated control system for industrial processes] to extract gas at the Urengoy deposit is to be put into operation on the basis of a dual-level information computer complex.

An ASU TP of gas transport along the gas pipeline Urengoy-Punga-N. Tura is to be put into operation on the basis of a dual-level information computer complex.

Operation is to begin for a pilot model of a multi-level automated control system in the structure of the Tyumengazprom VPO [All-Union Production Association] ASU and for an organizational-technical ASU in the gas extraction and gas transport production associations Urengoygazdobycha and Tyumentransgaz, on the basis of a distribution data bank and a regional network of computers with a remote data processing system.

ASU TP for development of the Urengoy gas and oil condensate deposit is to be introduced.

ASU-Repair (first and second sections) and ASU-Equipping are to be put into operation.

Some 90 compressor station shops are to be automated, and 9000 kilometers of the linear section of main gas pipelines are to be telemechanized.

A program of development and heightened efficiency for existing ASU in the gas industry is to be prepared for introduction through expanding the software and sets of optimized calculations, as well as systemic linking of the subsystems on a unified data basis.

Industrial operation of an improved automated system of YeSG [not further identified] dispatcher control on a unified data basis is to begin.

New forms of service for the first fully automated compressor stations for PKhG [surface gas storage] with boiler, pumping and electric power stations and other auxiliary objects are to be introduced.

Developing Oil and Gas Deposits on the USSR Continental Shelf

The PPBU 6000/200 floating semi-submersible drilling rig from the Byborgskiy Ship Building Yard is to be put into operation at accelerated rates.

A number of deep-water stationary drilling platforms for water depths over 100 meters are to be constructed and put into operation.

An automated control system for the environment and fire-explosion prevention, ensuring heightened reliability and safety in operating oil and gas field projects off-shore, is to be developed, and its experimental testing is to be begun at the existing stationary platform in the Black Sea.

Acceptance tests are to be carried out and new diving equipment to be turned over to production for work at off-shore deposits with water depth up to 60 meters.

Labor productivity is to be increased by 5 percent in drilling wells on the shelf by virtue of using new, highly efficient equipment, instruments and advanced technology, including by:

Bringing the volume of well drilling with new highly efficient types of rock-crushing instruments and ISM [artificial and synthetic materials] bits, reinforced with Slavutich super-hard alloy, to 284,000 meters;

Use, when drilling wells, of high-torque [illegible]adle turbodrills, screw and other bottom motors with a new structure, and ensuring with them drilling in the amount of 415,000 meters;

Wide-scale use of the cluster method of drilling inclined-directional wells.

Testing, at five gaslift wells of the Kaspmorneftegazprom VPO, experimental-model units for intermittent gaslift operation of wells.

Putting into operation the first section of the SAPR [automated design system] system of designing hydrotechnical structures based on the computer center of the Gipromorneftegaz NIPI [Scientific and Design Institute].

Making the transition to wide-band digital seismic stations, 48-96 channel receivers and emitters with higher power, making possible efficiency in marine geophysical work and reducing the volume of exploratory drilling when preparing deposits for operation.

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GAS CONDENSATE--EXTRACTION AND TREATMENT

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 2, Feb 84 pp 10-13

[Article by B.G. Bergo, Ye. N. Turevskiy, Ye. I. Chernikov and T. M. Bekirov (VNIIgaz) [All-Union Scientific Research Institute of Natural Gas]: "Field and Plant Extraction of Condensate: Lessons from Practice": Editor's comment: "Reasons for Low Yields"; Economist's response: "If There's An Incentive--There Will Be a Profit" (placed at end of article)]

[Text] Summarizing the most important points:

Processing gas under the planned conditions is the most economical way to achieve the most complete recovery of condensate from resource sites.

The ShFLU [a recovery agent--not further identified] fringe in the process of extruding condensate, contributes to a reduction in its residual saturation in the bed up to 7 percent.

Small field units to process condensate could play a chief role in the northern regions with hard access during the pioneering period of development; later these small units could give way to greater capacity plants.

> Specialists of VNIIgaz, using materials from the sector's gas extraction associations, scientific research and planning institutes, carried out work to determine the reserves and draw up proposals directed toward raising the level of extraction and processing of gas condensate.
>
> The effort examined resources and the level of gas condensate extraction at the principal gas extraction associations of the Ministry of the Gas Industry, as well as technical processes that make it possible to ensure complete extraction of heavy hydrocarbons from the gas, and measures to increase the operational efficiency of units preparing gas for transport and stabilizing condensate.

At the present time the NTS [low-temperature separation] method is used with three modifications: open, semi-closed and closed systems of collecting and stabilizing condensate.

The essential shortcoming in the open system of collecting lies in the considerable losses of condensate during its stabilization and storage. The introduction of the semi-closed system made possible a substantial reduction in loss of condensate and organization, for the first time in the gas industry, of a large production facility for propane-butane fractions at the Ukhtinskiy GPZ [gas processing plant]. The NTS method with the closed system was implemented for the first time at the Orenburg deposit. This system makes it possible to totally prevent losses of gas and condensate through degasification at the field.

The basic causes of unsatisfactory processing of gas and condensate at the fields, reducing the yield of commercial condensate, can be singled out: imperfection of the open and semi-closed systems of collecting and stabilizing the condensate; violation of the technical regulations (mainly failure to observe the low-temperature operating conditions); failure to observe the deadlines for putting into operation separator pump unit compressor stations and refrigerating units.

Losses of condensate are also connected with incomplete extraction resulting from mechanical carry-over in the main gas pipelines, with dissolving of the condensate in the accompanying liquids and with start-up-adjustment and repair work and storage in tanks. The proportion of these losses, however, is negligible and usually does not exceed 3.5 percent of the condensate extraction. It should be noted that the condensate, having entered the main gas pipeline in the vapor stage with the gas, is partially used, together with the gas, as fuel, i.e., is not irrevocably lost, but is used in an unqualified way.

Of all the deposits being developed by the Turkmengazprom VPO [All-Union Production Association], the most satisfactory indicators of field processing of gas are held by the deposits of Zapadnyy Dauletabad (Sovetabad) and Achak, where the dew point temperature is from 0 to -5°C. At the Zapadnyy Daulrtabad deposit these quality indicators are achieved through a large reserve of formation energy, and at the Achak deposit--through processing the gas at refrigeration units.

The situation that has formed at the deposits of Vostochnyy Shatlyk, Gugurtli and others stems from the drop in the working mouth pressures of the gas to 2.6-7.6 MPa and a lack of units for refrigeration, due to which it is impossible to process the gas at low temperatures.

At the Zapadnyy Shatlyk, Kirpichli and Beurdeshik deposits, at present the bed pressures still permit obtaining low temperatures by virtue of the Joule-Thomson effect, but for this it is first necessary to reduce the gas recovery.

Note must be taken of the unsatisfactory level of preliminary gas processing at UKPG [comprehensive gas preparation unit] and at all the deposits of the association, related to the low efficiency of the type TsRS separators installed at them, as well as the "gas-water" refrigerators. In connection with this, at the NTS units the gas enters with a high temperature and contains considerable amounts of water droplets, which does not permit stable maintenance of the low-temperature conditions for processing the gas, even with a sufficient reserve of formation energy available to obtain cold through the Joule-Thomson effect.

Gas is processed at the Ukrgazprom Association deposits at UKPG, developed according to the low-temperature separation method. Mainly GB-18 and GB-23 separator blocks are used at them, and they are insufficiently efficient (85-87 percent) with the planned load. As a result of this, mechanical carry-off of the condensate in the gas pipeline occurs.

The main deposit determining condensate extraction at the Komigazprom PO [Production Association] is at present the Vuktylskoye GKM [gas condensate deposit]. The chief source of the insufficient depth of extraction from the gas condensate is the failure to observe the planned parameters at the UKPG, brought about by delay in constructing the units ensuring separation of the gas at a temperature level of -10°C and a working pressure of 5 MPa. The condensate is lost also as the result of an excessively large amount of low-power equipment operating in parallel.

At the NTS units of the Zevardy, Shurtan and Kultak deposits, which determine the condensate extraction for the Soyuzuzbekgazprom VPO, the gas is cooled by the Joule-Thomson effect. According to the data of the association, the separation temperature is maintained in a range of 5 to -5°C.

However, the extent of extracting the condensate does not correspond to the temperature of processing the gas--the extent of extraction is 50 percent (instead of 70-75 percent). This is because of frequent disruptions in the low-temperature operating conditions. The main cause of preventing stable and uninterrupted maintenance of the low-temperature process of treating the gas is the low efficiency of the type TsPS separators (65-75 percent), which leads to excessive water in the diethylene glycol and creates the conditions for formation of hydrates in the low-temperature separator.

The introduction of a high-pressure, hermetically sealed system of collecting unstable condensate at the Orenburg gas condensate deposit permitted radical changes in the established tradition of developing gas condensate deposits and a considerable improvement in the technical-economic indicators of the gas extraction enterprise.

The use of formation energy for compresserless transmission of gas and unstable condensate from UKPG to the gas processing plant is specified. The product of the gas condensate wells is fed along stub pipelines to the NTS units, where the condensate, separated out in a single-phase state, enters the condensate pipeline. The gas phase is separated out in proportion to the advance along the relief pipeline due to the drop in pressure, and the further advance of the condensate to the GPZ is carried out in a two-phase state. The unstable condensate is transported from the UKPG under a pressure of 6.4 MPa.

The specific yield of stable condensate from the unstable is lower than planned by 0.56 grams per cubic meter of separated gas. At the same time, the total specific yield of stable condensate (from the unstable, and that completely extracted from the gas of the separation) is higher than planned by 2.93 grams per cubic meter of separated gas.

To improve the work of the gas processing units and increase the depth of extracting the condensate, the gas extracting associations and institutes in the sector propose carrying out the following measures at the main gas condensate deposits.

The first step in solving the problem of an increase in obtaining condensate should be to put into practice the technical decisions approved earlier, for example, construction of a center for collecting, stabilizing and pouring the condensate at the Seleshchina railroad station, the blueprints for which were issued by YuzhNIIgiprogaz.

In view of the fact that there are a large number of small gas condensate deposits in the Ukrgazprom VPO, constructing refrigeration units at each of them is economically inexpedient. Calculations showed that it is expedient to construct regional main structures, for example at MPGRS [not further identified] - Solokha for the northern group of deposits of the Poltava GPU [Gas Field Administration]. One of the potentials for increasing extraction of condensate is an increase in the condensate-yield of the beds through maintaining the formation pressure. Since 1981, the Novotroitskoye deposit has been under development using the cycling process which by the beginning of 1982 yielded 30,500 tons of additional condensate extraction. Plans were carried out for development, using the cycling process for the Kotelevskoye and Timofeyevskoye deposits, which will make it possible to obtain additionally another 8 million tons of condensate as compared with development to the point of depletion. In the future a large part of the condensate extraction will be obtained by using the cycling process. In order to reduce the losses of condensate and low-pressure gases of degasification, there must be a transition to the closed system of collecting and transporting the condensate, degasified to 1.6-2 MPa.

For deposits of the Shatlyk group and other beds in Turkmeniya, it is expedient to construct centralized units for gas processing in the Shatlyk and Pastynnaya Compressor Station region, which will make it possible to increase the total condensate extraction with minimum input of capacities to prepare the gas.

In addition, it is apparently possible to use, for processing gas from the Shatlyk group of deposits, including Sovetabad, the absorption method, and for gas entering the region of the Pustynnaya Compressor Station (Kirpichli, Beurdeshik, etc.), processing gas by the NTS method, using refrigeration units.

The basic organizational measures for the Soyuzuzbekgazprom VPO could be: transition to the closed system of collecting and transport of unstable condensate from the UKPG Dengizkul'-Khauzak, Urtabulak, Kultak-Pamuk-Alan with launching of a unit for condensate stabilization at the Mubarekskiy GPZ, putting into operation a condensate stabilization unit at the Shurganskoye deposit, expanding the tank farm of the service rack at Karaul-Bazar, and laying condensate pipelines from the Mubarekskiy GPZ and the Zevardy deposit.

Technical proposals for processing gas in the Vuktylskoye gas condensate deposit during the period of falling extraction are included in the complete development of the UKPG-3 refrigeration station.

Because of the drop in gas extraction and formation pressure at the Vuktylskoye gas condensate deposit, cold throttling of the gas to high pressure is depleted, and the operational effectiveness of turbine expansion engine units is dropping sharply. At the same time, at the UKPG-1,3, the refrigeration units are becoming underloaded.

To increase the efficiency of the system for field preparation of gas for transport, it is proposed that the gas entering the UKPG-1 and UKPG-2 be processed with the aid of a refrigeration unit located at the UKPG-1, and the flows of gas from UKPG-3, 4, 5 and 8 be cooled at the refrigeration unit located at the UKPG-3.

For practical realization of this technical proposal, the refrigeration station at the UKPG-3 must be completely developed with two refrigeration units, using the machines of 10 GKN of the separator pump unit compressor station for gases to degasify condensate, the machinery units of which are partially underloaded. In addition, it is recommended that the UKPG-8 be combined with the UKPG-2-GS gas collector.

Using the refrigeration station at the UKPG-1,3 for field processing of gas in the cold will make it possible to ensure the required dew point for the gas of the Vuktylskoye GKM for hydrocarbons. To ensure the dew point of the gas being transported by water at the UKPG-1,3 (a centralized processing system), there must be complete development with drying units.

The analysis presented of the state of equipment and technology for field processing of gas and condensate and the proposals of the production, planning and scientific research organizations showed that:

Through ensuring the planned conditions for processing gas at the six associations examined, it is possible to raise the extent of extracting condensate to 81 percent; a future increase in the depth of condensate extraction (to 91 percent) is possible only with the introduction at large gas condensate deposits of new, more power-consuming methods of processing gas;

The economic expediency of constructing centralized stations to process gas in various regions of the country should be evaluated;

It is particularly necessary to examine the problem of economic incentive for the efforts of the production workers and personnel at the planning and research institutes with respect to increasing the condensate extraction;

The basic goals and tasks of the scientific research and experimental design work being carried out at present and proposed for organization on the problem of increasing the depth of gas condensate extraction is to work out a process for drying and extracting from the gas condensate which has high efficiency in the entire period of operating the deposit, which eliminates the need for a large volume of construction and installation work in the period when the Joule-Thomson effect is exhausted; development of equipment of a new (unitized) type, the use of which will make possible a fundamental simplification of construction and installation work and operation of the unit; a reduction in energy consumption and other items of operational expenditure.

Editor's Comment

An analysis of the state of procedures for processing gas at the basic gas condensate deposits shows that the largest amount of condensate is not completely extracted and remains in the vapor phase in the gas fed to the main gas pipelines, due to the high temperatures of the separation.

The geography of low recovery is broad: deposits in Uzbekistan, Turkmeniya, Azerbaijan, the Ukraine and the Komi ASSR. The main reasons for failure to

observe the low-temperature conditions for processing gas are: delay in constructing and putting into operation units for refrigeration, centralized units for collecting and processing gas and separator pump unit compressor stations, the overload of industrial lines and also the insufficient efficiency of the separating equipment at the first stages of separation. Speeded-up recovery of gas leads to a premature reduction in the pressure of the gas at the wellhead and, consequently, to premature depletion of the Joule-Thomson effect.

Economist's Response

Particular note should be taken of the problem of economic incentive for the efforts of the production workers and personnel of the planning and research institutes for an increase in condensate extraction. The prices presently in effect for the liquid output of gas condensate fields do not reflect the actual input to obtain this product and its real consumer value (considering the possibility of replacing the scarce products of petroleum processing).

In particular, the close prices for "ShFLU" and compressed gas do not stimulate production of the most valuable product for the national economy of the winter [zimnii] type of compressed gases. While the production cost of the condensate obtained at the first stage of separation is essentially lower than its price, the production cost of condensate separated out from gas at units with refrigeration proves to be close to its wholesale price and, in some cases, even exceeds it.

Therefore, for gas extraction enterprises the construction and operation of refrigeration units appear to be of low profitability, and at the same time, obtain a great effect from improving the quality of the gas in the transport system.

The shortcoming in the existing approach to economic calculations of the objects for gas preparation is the fact that preparation of gas and its transport along a main gas pipeline are regarded in isolation, i.e., it is not taken into consideration that funds are invested in one (gas extraction) enterprise, but the effect is realized in another (gas transport).

The following variants can be proposed to stimulate an increase in condensate extraction: using world prices in economic calculations, establishing markups in the price for gas condensate and "ShFLU" produced at NTS units with refrigeration (or at absorption units), using prices for a closing type of fuel, calculation according to the cost of the end product of processing condensate and raising the prices for gas corresponding to the requirements of OST [All-Union Standard] 51.40-83.

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RECOVERY, TRANSPORT, UTILIZATION OF GAS CONDENSATE DISCUSSED

Summary

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 2, Feb 84 p 6

[Issues covered by articles on pp 6-10]

[Text] Testing new types of fuel obtained from condensate confirms the possibility of its use for normal operation of tractor equipment, both in the southern and in the artic latitudes of the country.

Gas condensate may be utilized advantageously at compressor stations using units for its distillation and wastes from chemical production facilities--stand testing of the compounds from methylal-methanol fraction with condensate showed an acceptable quality for a fuel mixture.

The presence of high-melt paraffins in the bed products of the Karachaganakskoye GKM is not an obstacle in the path of solving the problems of its being pumped over along the product pipeline--the use of special additives prevents the dropping out of paraffin crystals.

The topic in the given and the next four sections is gas condensate.

Condensate as Motor Fuel

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 2, Feb 84 pp 6-8

[Article by D.A. Pak and V.I. Mayrov (VNIIgaz) [All-Union Scientific Research Institute of Natural Gas]: "Gas Condensate--Raw Material for Obtaining Motor Fuel"]

[Text] The ever increasing demands for motor fuels with utmost saving of petroleum raw material causes a search for additional sources, one of which is gas

condensate. It is distinguished favorably from other types of raw material, since in processing it no complicated methods are used to obtain standard fuels, which does not require structural remodeling of the motors. The expediency of using gas condensate to obtain motor fuels is related to the possibility of producing them directly at the gas fields in the regions of Siberia, the Far North and other regions accessible only with difficulty.

Gas condensates at deposits are distinguished from each other by the fractional and group hydrocarbon composition. With respect to the fractional composition, some condensates correspond to gasoline or diesel fractions, others are a natural mixture of gasoline and kerosene fractions, and still others consist of a mixture of gasoline, diesel and higher boiling hydrocarbons. With respect to the group hydrocarbon composition, condensates in most cases relate to the paraffin-base or methane-naphthene types, and less often condensates are encountered with a high content of naphthene and aromatic hydrocarbons.

Of the condensates (without their being processed) similar with respect to fractional composition with gasoline or diesel fractions, motor fuels may be obtained under field conditions by a simple mixture of the condensates with standard fuels having a reserve with respect to corresponding indicators, or by adding special supplements to them. Deposits with this sort of condensate, however, are encountered comparatively rarely. More widespread are condensates with a broader fractional composition, and to obtain motor fuels from them requires appropriate processing.

Technical-economic research and industrial experience in processing gas condensate into motor fuel at the fields showed the expediency of using small units for this. Their optimum positioning in the absence of a developed infrastructure in regions that are not easily accessible will make it possible to fill the fuel needs of a large number of consumers efficiently and reliably.

At the Urengoy deposit, a small test-industrial unit, developed by VNIIgaz, has been in operation since 1979, to process condensate and obtain diesel fuel. In consideration of the physical-chemical properties of the raw material at this unit, a two-column rectification system was adopted, with the condensate separated into three fractions: commercial diesel, gasoline (a component of commercial gasoline) and the remainder, which is used as boiler fuel (mixed with gasoline fraction or condensate). The planned yearly productivity of the unit is 12,000 tons of raw material. At the present time, measures to double the condensate processing volume at this unit have been developed and are being put into operation.

At Mastakhskoye deposit, specialists of Yakutgazprom have constructed a test unit to process condensate, obtaining the component of motor vehicle gasoline A-76 and light boiler fuel. The flow chart for the unit has been simplified. The gasoline fraction is separated at regular intervals by one-time evaporation of the condensate in a stripping capacity.

In addition, an industrial unit with a yearly productivity for raw material of up to 50,000 tons, built in Dudinka from a design of VNIPIgazdobycha, has been in operation since 1982. At this unit a single-column rectification system has been adopted, with the condensate separated into two commercial fractions: diesel and gasoline.

An analysis of the work of these units showed that distilling the condensates into fuel fractions should be carried out by rectification, since the efficiency of the processing and the quality of the product also depend on the precision of the separation. With relatively small volumes of processing and a lack of continuous provision of raw material for the unit, as well as with a favorable composition of the condensate, one-time distillation may be used, as occurs at the Mastakhskoye deposit.

Manufacturing plans have now been developed at VNIIgaz for small stationary atmospheric rectification units UPPK-1, UPD-501, UPD-801 and UPD-1001, with a yearly productivity of respectively 4, 12, 16 and 25,000 tons for raw material. The units make it possible to separate the condensate into three fuel fractions. The UPPK-1 unit was developed in a block version and is designed to provide motor fuel for geological exploration parties, consumers along the condensate pipelines and also to utilize the condensate from small deposits, from which it is economically inexpedient to transport condensate. The unit is a single-column system with direct condensate distillation, but due to the complex structure of the fractionating column at the unit it is possible to process condensates of different fractional composition, with separation into three fractions: gasoline, diesel and heavy residue. The unit is composed of six basic blocks.

The UPD-501 unit is now in operation at the Urengoy deposit. From the results of its operation, a new improved UPD-1001 unit has been developed, the productivity of which is twice as much, and in which water supply to cool the processing products has been reduced to the minimum.

The UPD-801 unit, in contrast to the preceding ones, consists of a preliminary baffle and two following simple columns. This system for the unit permits the use, along with gas condensate, of low-density oil as raw material.

Wide-scale introduction of the small units developed is held back, however, due to a lack of manufacturing plants. The potentials of the VNIIgaz test plant and its specific nature permit the manufacture of only test models of the units.

The need has recently arisen to develop a more powerful small stationary unit. VNIIgaz, in conjunction with VNIPIgazdobycha [All-Union Scientific Research and Planning Institute for Gas Extraction] and TsKBN [not further identified], has developed a block-unit UPKM [not further identified] with a yearly productivity of 50,000 tons for raw material. The flow chart of the unit has been improved as well, in consideration of the industrial operation of the UPD-501 unit. Water cooling is completely eliminated at the UPKM unit. Due to combining the heater for stripping the light fraction from the diesel with

the stripping still there is no hot pump in the system. Two tube furnaces operating in parallel are specified to increase the reliability of the unit's work. The unit is composed of nine blocks. Introduction of four units is outlined at the Urengoy deposit in 1984.

At present, for more complete utilization of condensates in small volumes at places where they are not constantly extracted (testing wells, recovery of natural gas to drive the drilling rig, etc.), it has become necessary to develop small mobile units. Such units could process, at regular intervals in various regions, the condensate accumulated in the collecting tanks into motor fuel. It is complicated, however, to develop a mobile unit due to the lack in industry of pumps with low productivity (1-2 cubic meters/hour) with a light structure and calculated for operation under northern conditions.

In the total volume of motor fuel consumption at the fields, the main share falls to diesel fuel. Studies and stand tests carried out showed the possibility of raising the output of diesel fraction from condensate by lightening the fractional composition of the diesel fuel, corresponding to GOST [All-Union State Standard] 305-82, with low-octane gasoline fractions. At the same time, this solves the problem of a reduction in output from the units of a substandard gasoline fraction.

The output of a gasoline fraction with a lower end boiling point has a favorable effect on its motor characteristics. For example, when producing standard diesel fuel (GOST 305-82) at the UPD-501 unit at the Urengoy deposit, the fuel yield is approximately 33 percent. At the same time, the octane number of the gasoline fraction is not over 66 points. Obtaining widely fractionated fuel at the unit increases the yield of fuel for high-speed diesels to 54 percent for raw material.

The octane number of the lightened gasoline fraction with an end boiling point equal to 130°C is increased to 72 points. It should be noted here that when wide-fraction fuel is produced for high-speed diesels, some of its quality indicators are at a low limit, when there is no longer a need to remodel the structure of the engine. From this standpoint, precision of rectifying the fuel fractions at the units acquires great importance. The quality of the diesel fraction is favorably affected by reducing the content of lighter hydrocarbon fractions, and for the gasoline fraction, as the result of reducing the concentration of high-molecular n-paraffins, the detonation resistance rises.

In processing saline condensate at the unit in Dudinka a gasoline fraction is obtained with an end boiling point of about 140°C. Due to the absence of light hydrocarbons, the fractions have a low pressure of saturated vapors. The octane number of the fraction reaches 76 points. Testing this type of fuel produced in accordance with TU [technical specifications] 51-126--83 (test batch) for gas-condensate motor vehicle gasoline type 76, showed satisfactory results. The low pressure of saturated vapors for the fuel did not prevent motor start-up in winter.

Qualifying tests made at the VNIINP [All-Union Scientific Research Institute of Petroleum and Gas Processing and the Production of Synthetic Liquid Fuel] of test samples of gas-condensate wide-fraction fuel for high-speed diesels

at the first stage showed satisfactory results. In accordance with the resolution of the Interdepartmental Commission at USSR Gosstandart, GSh [not further identified] was permitted for use in operating equipment under observation. VNIIgaz in conjunction with VNIINP drew up technical conditions for gas-condensate fuel of type GShZS for Urengoy, type GShA (test batch) for the Noril'sk region and type GShL (test batch) for Central Asia.

One of the most important directions in processing gas condensates is working out new methods to obtain quality standard motor vehicle gasolines, since the gasoline fractions of the condensates in general have a low anti-detonation resistance. At VNIIgaz scientific research work and experimental design work are being carried out to develop small units to obtain quality standard motor vehicle gasolines using thermo-cracking and catalytic refining processes. The thermo-cracking process is based on the principle of treating the gas condensate fractions with a warmed heat-transfer agent. This process makes it possible to design a compact unit and obtain gasoline type A-76 with a yield of 80 percent from the raw material. A manufacturing plan for a unit with a productivity of 10,000 tons for the raw material was carried out by VNIIgaz and VNIPIgazdobycha for the Urengoy deposit. A process for catalytic refining of the gasoline fractions is being developed in conjunction with the Institute of Catalysis of the Siberian Division of the USSR Academy of Sciences, which developed for these purposes a high-siliceous catalyzer, making it possible to obtain in one step motor vehicle gasoline type AI-93. At the present time, technical specifications are being worked out for a test-industrial unit applicable for condensates of the Urengoy and Sredne-Botuobinskoye deposits.

Using gas condensates as power-generating fuel for boiler units is an important problem. This is because of the fact that in gas extracting regions there are a large number of boiler units, and using standard boiler fuels with a relatively high solidification temperature complicates their operation in a severe climate zone. Therefore, scarce low-freezing diesel fuels are often used as fuel for boiler houses. Gas condensates, as opposed to standard fuels made from petroleum raw material, have a light fractional composition, which increases the fire and explosion danger at the object where they are being used. As industrial tests have shown, however, this does not prevent the use of condensates with adherence to the appropriate fireproofing measures. Drawing up the corresponding normative documents would contribute to reducing the danger when storing and using condensates as light boiler fuel. Therefore, accelerating operational tests and standardization of gas-condensate fuels would make it possible to increase the efficiency and depth of utilizing condensate at the sites.

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Gas Condensate Utilization Suggestions

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 2, Feb 84 p 8

[Article by V.P. Fedorov, Kh.N. Zaynullin and V.V. Myznikov (Ufa Petroleum Institute, Saratovtransgaz): "If there is Condensate in the Gas Pipeline: A Proposal by Competent Specialists"]

> [Text] At modern gas transport enterprises there is gas condensate, separating out at the input dust collectors of compressor stations. This condensate is mainly consumed nonproductively. Experience shows, however, that even in the absence of special equipment the gas condensate at compressor stations can be processed effectively for a fuel variant.

Gas condensate separating out at various compressor stations is distinguished by its fractional composition with essentially unchanged transport gas flow. At the beginning of the gas pipeline the heavy hydrocarbons fall out and at the end--the lighter ones. The difference in the fractional compositions are quite considerable when the gas pipelines extend a long way.

The basic shortcomings in unprocessed gas condensate as a motor fuel for carburetor engines are: a low octane number (from 46 to 62), poor start-up properties due to the high initial boiling point and increased carbonization. The most acceptable way to eliminate these shortcomings under conditions of transport enterprises is compounding the condensate with oxygen-containing combinations.

Studies made of the wastes of petrochemical production facilities, suitable for compounding with gas condensates, showed that the most acceptable are methylal-methanol fractions--the waste from production of isoprene by the dioxane method and the "ester head"--the wastes from producing butyl alcohol. The methylal-methanol fraction and the "ester head" have a low initial boiling point and high octane number. In addition, when these wastes are mixed with gas condensate, azeotropic mixtures are formed, which have an initial boiling point lower than the initial boiling point of the substances mixed, ensuring mixtures with normal start-up properties. The presence of the chemically combined oxygen permits the mistures to burn more completely and reduces the ejection of harmful substances with the exhaust gases and carbonization. This is confirmed by stand tests of these compositions.

Condensates with an end boiling point of not over 220°C are suitable for using the mixture as gasoline for combination. At the same time, fuel mixtures made of condensate, "ester head" and methylal-methanol fraction correspond in practice to GOST [All-Union State Standard] 2034-77 for A-76 gasoline with respect to the fractional composition, and correspond completely with respect to the octane number. When condensate is compounded with methylal-methanol fraction and methanol, a composition can be obtained corresponding to AI-93 gasolines. The use of methanol as an additive to gasolines at gas transport enterprises is impracticable, however, due to the exceptionally high requirements of the Current Rules and Instructions for use of gasoline-methanol mixtures.

In associations having gas drying units, these units may be used to eliminate high-boiling hydrocarbons from the gas condensate. For this, the gas condensate is fed into a column for regeneration of diethylene glycol (DEG) together with preheated depleted DEG containing a certain amount of water. When the mixture is heated above the boiling point of water, the water and light hydrocarbons are removed from the DEG. The end boiling point of the hydrocarbons removed will be somewhat higher than the temperature at the top of the column (170-180°C).

To avoid accumulation of heavy hydrocarbons in the DEG, the condensate fed in should have an end boiling point of not over 220°C. With this, the accumulation of heavy hydrocarbons in the DEG is negligible, and they serve as an absorbent for the condensate in the drying gas flow.

The normal system for utilizing gas condensate is to design several stationary units for direct distillation of the condensate, with a productivity of 10-15 cubic meters per day. These units should produce fractions of motor fuels and then, by mixing these fractions with each other and with the wastes from the chemical production facilities, fuel mixtures may be obtained which correspond to gasolines and also to diesel fuels. The flow chart of these units is very simple and depends on the fractional composition of the initial condensates. At the initial sections of the gas pipeline the flow chart includes two rectification columns and blocks to heat up the condensate and cool the products obtained. The special product is the diesel fuel fraction, which, after adding supplements, can be used as diesel fuel in the summer.

In the northern sections of the gas pipeline it is more practicable to obtain from the condensate, using a single-column system, gasoline fractions which, after compounding with high-octane components, can be used as commercial gasolines A-72, A-76 and AI-93.

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Condensate Transport Method Proposed

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 2, Feb 84 pp 9-10

[Article by E.S. Klyucheva, V.A. Krasnikov, A.N. Nosova and V.L. Blintsova (YuzhNIIgiprogaz) [not further identified]: "Using Additives When Transporting Condensate"]

[Text] To prevent the formation of high-melting paraffin deposits it is suggested that additives be used which will make it possible to transport hydrocarbon condensate from the Karachaganakskoye gas condensate deposit (GKM) at temperatures lower than the temperature of the onset of crystallization.

Primary processing of hydrocarbon condensate from the Karachaganakskoye GKM is outlined for implementation at the Orenburg GPZ [Gas Processing Plant]. Considering the fact that the deposit is located a considerable distance from

the plant, and the condensate contains high-melting paraffins, its transport will entail certain difficulties: hydroparaffin and tar-paraffin deposits may form in the product pipelines at low soil temperatures.

One of the promising measures reducing the intensiveness of paraffinization is the chemical effect on the transport system through supplementation with additives.

The paraffinization intensiveness may be indirectly estimated according to parameters characterizing hydrocarbon condensate such as the cloud point and the onset of crystallization and solidification.

A study was made under laboratory conditions of the effect on the hydrocarbon condensate of the Karachaganakskoye GKM of 23 descriptions of additives, for which the abovementioned temperature characteristics were determined, depending on the content of the additives. A test of the hydrocarbon condensate showed a producing horizon of 4013-4120 meters at Well No 2 of the Karachaganakskoye GKM.

The relationships of the cloud point, the onset of crystallization and solidification of the hydrocarbon condensate to the content in it of certain additives are shown in figures 1, 2 and 3. Even a small (less than 0.1 mas., proportions in percent) supplement with additives leads to a substantial reduction in the characteristic temperatures.

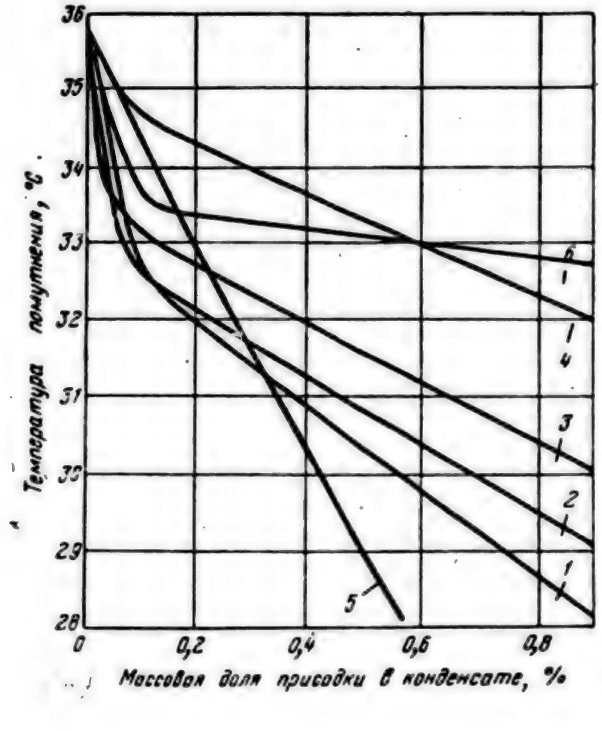

Fig. 1. Relationship of the Cloud Point of the Karachaganakskoye GKM Condensate to the Content of Various Additives in it:

1--Paraflow; 2--AzNII; 3--TsIATIM-I-20A; 4--SZhK (Berdinskiy Experimental Petroleum-Oil Plant); 5--SZhK (Kuybyshevnefteorgsintez PO); 6--SZhK (Shebekinskiy NKhK)

a)--cloud point, in °C; b)--mass proportion of additive in condensate, in %

From the analysis of figures 1 and 2, it follows that for hydrocarbon condensate and for its mixtures with additives, with a given content of additive the values of the cloud point and the onset of crystallization are different. Some authors explain this by the presence in the mixtures being studied of asphalt-tar and sulfur compounds, while others note that when mineral oils are used as solvents, no similar phenomenon is observed.

A comparison of the action of additives during their selection may be made both according to the change in the cloud point and according to the change in temperature at the onset of crystallization of a condensate of a given composition after supplementation with additives. With respect to the amount of additive introduced into the product being transported, this should be calculated on the basis of the change in temperature of the onset of crystallization. It should be lower than the minimum temperature of the soil for the strip in which the product pipeline is laid.

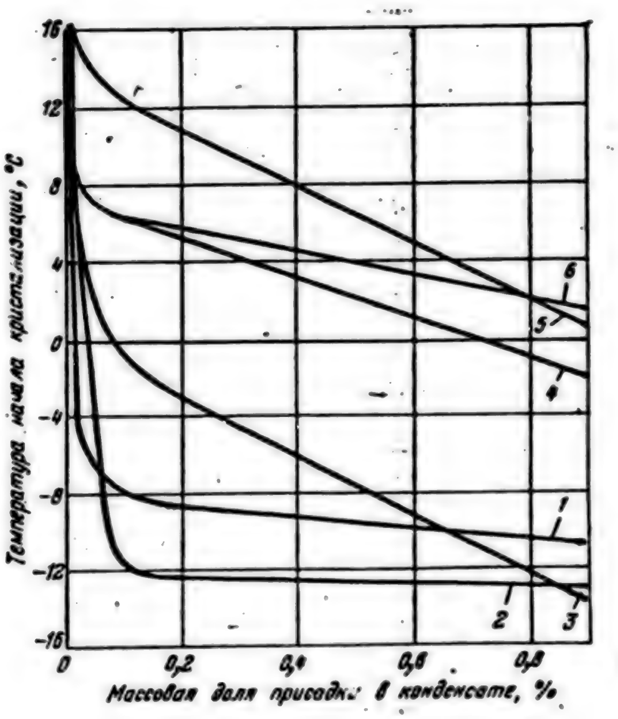

Fig. 2. Relationship of the Temperature of Onset of Crystallization of the Karachaganakskoye GKM Condensate to the Content of Various Additives in it.

Conventional designations are the same as in Fig. 1.

a)--temperature of the onset of crystallization, in °C; b)--mass proportion of additive in condensate, in %

It has been experimentally established that the temperature of the onset of crystallization of paraffin hydrocarbon condensate may also be reduced with its dilution by hydrocarbon condensate that does not contain high-melt paraffins. In the case examined this is the condensate of the Orenburg GKM. The results of experimental studies of the temperature characteristics of mixtures of hydrocarbon condensates from the Karachaganakskoye and Orenburg GKM are given in the table. Given here are calculated values of the cloud points and the onset of crystallization of the mixtures obtained from deduced empirical equations approximating the experimental data. The problem of approximation was solved in accordance with the equalization principle. The parameters of the equations were determined by the method of least squares, using a program run on an electronic keyboard computer BZ-21.

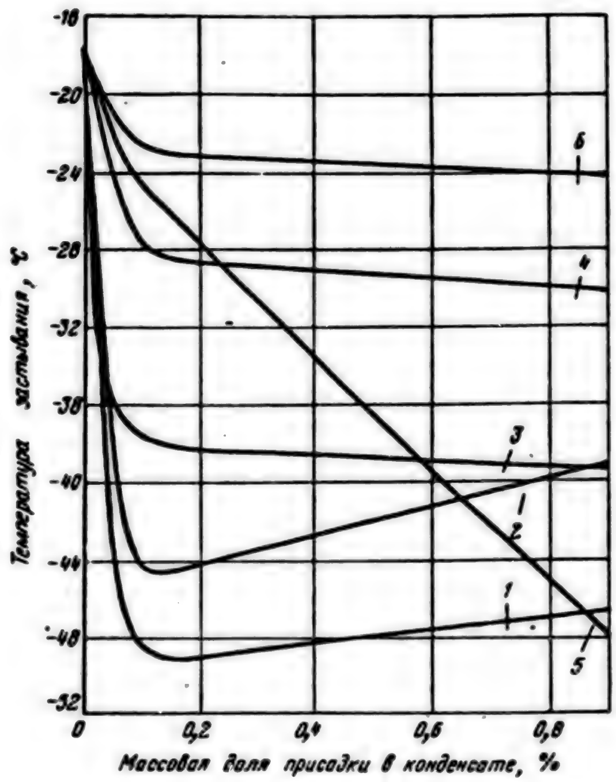

Fig. 3. Relationship of the Solidification Temperature of the Karachaganakskoye GKM Condensate to the Content of Various Additives in it.

Conventional designations are the same as in Fig. 1.

a)--solidification temperature, in °C; b)--mass proportion of additive in condensate, in %

Cloud Points and Temperatures of Onset of Crystallization of Mixtures of Hydrocarbon Condensates from Karachaganakskoye and Orenburg GKM

Concentration of condensate from Orenburg GKM in mixture, in mas. proportion, in %	Experimental values of temperatures, in °C		Calculated values of temperatures, in °C		Accuracy of temperature calculation in °C	
	cloud point	onset of crystal-lization	cloud point	onset of crystal-lization	cloud point	onset of crystal-lization
2.44	35	17.0	36.0	18.0	-1	-1
4.00	34	16.5	33.8	16.5	0.2	0
5.88	33	15.5	32.1	15.3	0.9	0.2
20.00	28	13.5	26.7	11.6	1.3	1.9
33.33	27	12.0	24.5	10.1	2.5	1.9
50.00	23	6.0	22.8	--	0.2	--

The cloud point was calculated from the equation

$$t_{\text{псм}} = 273.16(1.1459x^{-1.4467 \cdot 10^{-2}} - 1)$$

When $2.44 \leqslant x \leqslant 50$, the maximum relative error of the calculation does not exceed 9.2 percent.

The temperature of the onset of crystallization was calculated from the equation

$$t_{\text{н.кр}} = 273.16(1.0752x^{-1.0469 \cdot 10^{-2}} - 1)$$

When $2.44 \leqslant x \leqslant 33.33$, the maximum relative error of the calculation does not exceed 15.7 percent.

On the basis of the research results given, the conclusion was drawn concerning the possibility of "cold" transport of paraffin hydrocarbon condensate from the Karachaganakskoye GKM, using additives.

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PROBLEMS OF GAS RECOVERY IN FAR NORTH DISCUSSED

Moscow GAZOVAYA PROMYSHLENNOST' in Russian No 4, Apr 84 pp 30-31

[Article by V. V. Strizhov, A. I. Gritsenko and O. M. Yermilov of Nadymgazprom [Nadym Gas Industry], VNIIgaz [All-Union Scientific Research Institute of Natural Gas] and TyumenNIIgiprogaz [Tyumen Scientific Research Institute of the State Institute for the Planning of Gas], under the rubrics "Field Development" and "By Way of Discussion": "Gas Fields of the North: A New Approach to Phases of Development"]

[Text] This article analyses the status of the topic of defining the phases of gas field development, sets forth the specific features of the comprehensive management and planning of the technical and economic indicators of the major gas fields in the north of Tyumen Oblast, and proposes a new approach to identifying the phases of exploiting those fields.

The development of gas fields is characterized as a rule by three phases of exploitation that replace each other in sequence: the expansion, steadiness and decline of gas recovery [1,2,4,6]

The commitment of the principal resources of gas-recovery systems (GDS) and gas-transport systems is based on the indicators of the steady recovery phase.

When developing major fields, where exploitation is linked to significant capital expenditures, it is necessary to strive so that the steady recovery phase will be as much larger as possible relative to the expanding and developing phases. This is especially vital tor the fields in northern Tyumen Oblast. Here the costs of setting up GDSs and FTSs are more considerable.

The industrial exploitation of gas and gas-condensate fields by way of maintaining targeted extraction is divisible into two main stages: noncompressor and compressor.

As is well known, the non-compressor phase of exploitation referes to the phase in which formation pressure is sufficient to move the gas from the well to the first line compressor station or GKS [gas compressor station] of the trunk pipeline. Gas recovered in this way has the minimum production cost.

The duration of the non-compressor phase of exploitation depends on a number of factors: the targeted rate of gas extraction, the operating routine for the reservoir and type of field, initial formation pressure, pressure in the trunk pipeline, distance from consumers, etc.

Alongside the traditional division of field development into three phases, some researchers have proposed to single out a final phase of reservoir exploitation, which has so far received little attention [3,5].

By way of justification the authors offer the following specific features of the final phase of development:

--low absolute volumes of annual recovery and of total gas extraction for this phase;

--considerable duration of exploitation, consisting of about half the total phase of development; and

--negligible impact of this phase on the magnitude of total gas output from the field and on the ultimate gas-recovery factor.

The dynamics of the rates of gas extraction are basically the chief criterion for delineating the phases of development. But, obviously, rates of gas extraction are not uniform and are not always the determining feature of the status of reservoir development.

The exploitation of the major gas fields in the north is connected with considerable costs to the national economy.

Therefore, for given reservoirs a specific phase of exploiting them must be identified not only with reference to the volume of gas output, but also with due regard for changes of the economic indicators and for organizational and technical factors.

Let us look at the more typical features of exploiting the major gas fields of the Far North as they apply to the matter under analysis.

CONSIDERABLE DISTANCE FROM CONSUMERS AND INDUSTRIAL CENTERS. The distance from the northern fields to consumers is on the order of 1500-3000 km, that is, several times farther than the reservoirs put into operation earlier in the European part of the USSR and in Central Asia. This has required the construction of extensive and high-cost trunk pipelines. Thus, the task of the relative magnitude of duration of the phase of stable extractions from the fields at times takes on still greater urgency for improving the efficiency of the load on the gas-transport system.

LARGE ABSOLUTE GAS RESERVES OF THE FIELDS. In the final stage of development, when formation pressure declines substantially and the delivery of gas to the trunk pipelines is unprofitable, there remains in the formation a considerable amount of gas, even when it is a relatively small percent. Relatively large, if not compared with earlier exploited fields, the residual gas reserves of these reservoirs are equal in magnitude to several minor fields of the central part of the country, and the absence of local energy consumers dictates the need to discover, develop and introduce fundamentally new and economically justifiable planning solutions, with due regard for comprehensive exploitation of the field and development of the region.

The exploitation of the Saratov field, which had initial reserves considerably lower than Medvezhye and has been under development for more than 30 years, serves as an example of a proprietary attitude toward gas resources. According to forecasting estimates as well as the experience of developing other gas fields, the ultimate gas recovery factor of the Medvezhye field will not exceed 0.85-0.87. At that, the residual low-pressure-head gas will be sufficient, for example, to supply regional needs for many decades.

SLIGHT DEPTH OF THE OCCURRENCE AND COMPARATIVELY LOW FORMATION PRESSURE. The gas reservoirs of northern Tyumen Oblast have relatively low initial formation pressures, reaching on the average 10.90 MPa. At the same time, the average initial formation pressure at six earlier developed and larger fields (Orenburg, Shebelinka, Shatlyk, Gazli, Vuktylskoye and Krestishchenskoye) reached 27.14 MPa.

The relatively low initial formation and the use of trunk pipelines with an operating pressure of 7.35 MPa has brought about the need for the comparatively early introduction of DKS [expansion unknown].

Analysis of the Medvezhye field indicators and forecasting calculations provides evidence that approximately half the duration of the stable extractions from reservoirs will be exploited in the non-compressor mode, and half in the compressor mode.

USE OF LARGE-DIAMETER WELLS. In the northern fields for the first time in our country's experience wells have been used with an NKT [pump and compressor pipe] diameter of 168 mm, which has brought about an increase in the efficiency of their exploitation.

However, in the late stages of field development, to ensure steady modes of well operation (owing to a substantial decline of their yields and a growth in the volume of condensation and formation water in the gas flow) it will be necessary to use NKT of lesser diameters and to redo the wellhead equipment throughout the entire remaining reserve.

VERY SPARSE SETTLEMENT OF THE AREAS UNDER DEVELOPMENT. An enterprise exploiting a northern field has the expense of almost the entire social and community infrastructure: housing resources, administrative and commercial buildings, communications, roads, facilities for health care and social and

cultural activities, school and kindergartens. Electric power and heating must be installed, sewage and water treatment facilities built, arrangements made for repairs, etc.

This leads to a radical change in the conditions of shaping and structuring the basic economic indicators of the region's gas-recovery enterprises (GDP) when compared to the conditions for arriving at analogous features for enterprises in settled rayons.

SPECIAL FEATURES OF CHANGING AND PLANNING ECONOMIC INDICATORS. The industrial associations in the Ukraine and in Krasnodarskiy Kray and Stavropolskiy Kray exploit dozens of medium and small fields at various stages of development and with various trends of change in technical and economic indicators. This situation allows the regulation and equalizing of the dynamics of change of economic characteristics in the association as a whole for a specified period.

As a rule, the gas-recovery enterprises of northern Tyumen Oblast exploit one major gas field. Here change in all the geological, production and technological indicators of its development completely determines the economic indicators of the enterprise's activities at every stage.

This must be taken account of in the plans and management figures of the enterprise, both for the future and for the current year.

Besides that, from the moment a field begins planned output "by startup systems" all economic indicators start to decline. For each year of maintaining the same level of gas recovery there must be an addition of supplementary capacities, an expansion of production and repair services, and an increase in the number of industrial-production personnel.

The decline in economic indicators is natural and inevitable. Therefore it is the task of a production association at a given phase to slow down the natural and inevitable rate of decline of labor productivity, and the rate of increase in the production cost of gas recovery. For this, the optimum rates of change of economic indicators must be detailed in the development plan, and divided into stages.

This will facilitate the avoidance of many difficulties and disproportions in planning the economy of northern GDPs, and facilitate objective evaluation of the efficiency of the economic activities of its collective at various phases.

It must be noted that highly detailed planning of the economy of a northern GDP when classifying the development of a field is only for the three phases: expanding, steady and declining recovery.

There are major differences in the formation of the economic indicators of northern fields even in the steady recovery phase. At the stage of non-compressor exploitation they monotonously decline as a result of adding unassimilated capacities and introducing measures to increase the reliability

of field development. With the startup of a DKS, the rate of their decline grows noticeably and is determined by causes of a quite difference nature; and it is governed by other economic and organizational rules. The operating efficiency of a GDP in this case must be evaluated by different means.

A similar picture can be drawn for the phase of declining recovery.

Between the stages of profitable transport of gas to central districts and the stages of utilizing the residual reserves of it solely for local needs, there will be substantial differences in the criteria for evaluating the economic activities of a GDP. There will also be differences in methods of evaluating and increasing the operating efficiency of GDPs in the north.

Considering that the contribution of the northern fields to gas recovery throughout the country is becoming a determining factor, the matters cited must obviously also be given attention in planning the economy of the industry as a whole.

Based on the comprehensive analysis of all the factors mentioned above for the major northern gas reservoirs, it is advisable to divide them not into three but into five distinguishing phases:

1. the phase of intensively expanding recovery;

2. the phase of steady recovery based on the formation's store of energy;

3. the phase of steady recovery based on intensified development (drilling new wells and construction of first, second and third sequences of DKSs);

4 the phase of declining recovery; and

5. the phase of follow-up development for the energy needs of local consumers.

The division into five phases of development will make it possible to depict more vividly the distinguishing features at each stage, and, most importantly, to correctly evaluate the main directions for allocating forces throughout the whole extent of reservoir development and to more rationally solve technical, economic and organizational problems.

We believe that this will improve the efficiency of the comprehensive exploitation of the fields and of the region as a whole, and will facilitate an engineering approach to the development of the social programs for building up and settling the Far North.

BIBLIOGRAPHY

1. Korotayev, Yu. P., Zotov, G. A., Kichiyev, K. D., Methodology of Planning the Development of Gas and Gas-Condensate Fields, Moscow, Nedra, 1966.

2. Rules for Developing Gas and Gas-Condensate Fields, Moscow, Nedra, 1971.

3. Fish, M. L., Leontyev, I. A., Kharamenkov, Ye. N., Estimating Gas-Recovery Factors in the Phase of Declining Output. Survey Series: Development and Exploitation of Gas and Gas-Condensate Fields, Moscow, VNIIEgazprom [All-Union Scientific Research Institute of Economics, Production Organization and Technical-Economic Research for the Gas Industry], 1974.

4. Rassokhin, G. V., The Final Stage of Development of Gas and Gas-Condensate Fields, Moscow, Nedra, 1977.

5. Dinkov, V. A., Gritsenko, A. I., Vasilyev, Yu. N., Muzhilivskiy, P. M., Improving the Efficiency of Utilizing Gas in Compressor Stations, Moscow, Nedra, 1981

6. Determining the Level of Gas Output for the Long Range. A. I. Gritsenko, V. I. Yermakov, I. P. Zhabrov, and others, GAZOVAYA PROMYSHLENNOST', 1982, No. 10, pp. 6-8

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ACHIEVEMENTS OF ROSTOV GAS INDUSTRY DETAILED

Moscow ZHILISHCHNOYE I KOMMUNAL'NOYE KHOZAYSTVO in Russian No 3, Mar 84
pp 30-31

[Article by G. A. Somov, director of the Rostovoblgaz Industrial Association: "Don Gas Workers on the March for the Five-Year Plan"]

[Excerpts] Rostov Oblast, with a population of more than 4 million and with its developed multi-sector industry and its agriculture, annually increases its consumption of natural and liquified gas. The enterprises of the Rostovoblgaz (Rostove Oblast Gas) industrial association provide a steady supply of them to all consumers.

The gas industry of Rostov Oblast is a major independent sector that incorporates enterprises for gas supply and the installation of gas facilities, gas replacement stations, and specialized units that make major repairs to gas pipelines and equipment, protect underground gas pipelines, deliver liquified gas to consumers, and install equipment and gas service.

The association includes 29 maintenance administrations, 3 gas replacement stations, and 40 rayon services and sections, which employ 4700 persons. They provide maintenance and technical servicing for more than 5000 km of designated pipelines, 1220 GRP [gas distribution points] and facilities, and more than 1290 household appliances. The volume sold amounts to 4.7 billion m^3 of natural gas, and more than 57,000 tons of liquified gas.

The considerable rates of installation of gas facilities, the growth of industrial capacities, and the establishment of new structural units have demanded the accomplishment of measures to improve the structure and to reorganize the administration of the oblast's gas industry.

In January 1982 the Rostovoblgaz administration was reorganized under the oblispolkom into an industrial association for installing gas facilities and supplying gas. The concentration of control and economic planning functions within the staff of the association and the strengthening of municipal and inter-rayon enterprises have made it possible for the gas industry to achieve management and control on a higher engineering and technical level, and its enterprises to concentrate their efforts on solving the problems of installing gas facilities and maintaining equipment and the gas supply.

The 11th Five-Year Plan (and especially 1982) has become for the Rostovoblgaz collective a period of considerable achievements in increasing the efficiency of production and improving the quality of work. The association has twice held first place in the competition of the enterprises of the RSFSR gas industry, and was acknowledged the winner of the all-Russian socialist competition in honor of the 60th anniversary of the formation of the USSR by the award of the challenge Red Banner of the RSFSR Council of Ministers and the VTsSPS [All-Union Central Trade-Union Council].

The oblast's gas industry as a whole is operating without the enterprises lagging behind, and is consistently overfulfilling its planned quotas.

In the 2.5 years of the current five-year plan, 423 km of gas pipelines have been built and put into operation in Rostov Oblast, including 104 km in excess of the official plan, and 99,770 apartments have had gas installed, including 17,570 in addition to the plan. In the same period the construction has been accomplished of branches from trunk pipelines to supply gas to the cities of Tsimlyansk and Konstantinovsk, to Veshenskaya Station, to the rayon-center villages of Peschanokopskiy and Kuybyshevo, and to the settlements of Pokrovskiy and Matveyev-Kurgan. The plan for receipts from services to the populace and to municipal and general enterprises was fulfilled by 105 percent. Operating costs for the transport of natural and liquified gas were reduced by 2.9 percent and 4.7 percent, respectively.

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NON-NUCLEAR POWER

DEPUTY MINISTER OF POWER, ELECTRIFICATION ON CEMA COOPERATION

Moscow EKONOMICHESKOYE SOTRUDNICHESTVO STRAN-CHLENOV SEV in Russian No 2, Feb 84 pp 14-17

[Article by Nikolay Lopatin, deputy minister of power and electrification: "Results and Prospects of Cooperation"]

[Text] Through systematic development, electric power in the USSR has attained a leading position. In 1982, 1.36 trillion kilowatt-hours of electric power were produced. Today the industry has the most powerful thermal and hydroelectric power stations, equipped with the most up-to-date technology.

From year to year, there is expansion and intensification of its ties with the energy systems of other states, especially CEMA member countries. These ties are multifaceted and include various forms of international division of labor. Here there is interaction in science and technology, joint construction of large projects, cooperation in the production of equipment in which all or groups of countries are interested, reciprocal supplying of electric power, etc.

The basic directions of USSR Cooperation with fraternal countries are determined by the peculiarities of the formation of their energy balance.

As is known, one of the most important problems in the present period is that of satisfying the intensively growing demands of the national economies of CEMA member countries for fuel and energy. It is being solved in accordance with the over-all program and the DTsPS [Long-Term Target Program for Cooperation] on energy, fuel and raw materials. Today, together with our own efforts, more and more importance is being attached to the wide use of effective and mutually advantageous forms of international division of labor on multilateral and bilateral bases.

The interaction of the USSR with other CEMA member countries is being carried out in the framework of the CEMA Permanent Commission on Cooperation in the Field of Electric Power. Particularly notable among the many questions decided by the commission is that of the creation and consequent development of OES [Unified Electrical Power Systems] of CEMA member countries as well as the question of the organization of their parallel work under a unified production control administration located in Prague.

In the 20 years since the uniting of energy systems, there has been a significant rise in the production and consumption of electric power, the capacity of electric power blocks and electric power stations increased, there was improvement in the technical and economic indicators for the production and transmission of electric power, and intensive development occurred in intersystem connections and reciprocal deliveries.

In 1982, there were 22 electric power transmission lines [LEP] between the countries participating in the unified production control administration at a voltage of 220 kilovolts and higher and two at 110 kilovolts. In addition, nine intersystem connections functioning at a voltage of 110 to 400 kilovolts linked the OES with the Yugoslav energy system.

An important step in the cooperation of the USSR with other CEMA member countries was the construction and bringing into operation of the first international LEP-750 between Vinnitsa (USSR) and Albertirsa (Hungary), a distance of 842 kilometers. It is intended to provide service parallel to that of the Unified Energy System of the USSR and the OES of the CEMA member countries and also to provide for growth in the planned deliveries of electric power from the USSR to interested fraternal countries.

The development of intersystem connections also helped to increase the exchange of electric power among European CEMA member countries themselves. As a result, the rate of growth in reciprocal deliveries over the last 10 years was 1.5 times greater than the corresponding indicators for total consumption.

At the present time, CEMA member countries account for 21 percent of worldwide electric power production compared to 13.6 percent in 1950. They now produce 1.4 times as much electric power as the EEC states. One can judge the energy potential of CEMA member countries from the data in the table.

Country	Electric Power Production in billions of kilowatt-hours		Established Capacity of Electric Power Stations, millions of kilowatts	
	1972	1982	1972	1982
Bulgaria	22.27	40.30	4.46	9.49
Hungary	16.11	24.31	3.21	5.64
GDR	72.83	102.91	14.19	21.89
Cuba	5.40	11.00	1.51	2.80
Mongolian People's Republic	0.63	1.50	0.23	0.43
Poland	76.48	117.58	16.13	26.84
Romania	43.44	68.80	8.90	16.91
USSR	857.44	1,367.00	186.24	287.20
CSSR	51.40	74.70	11.90	18.92
Total for CEMA Member Countries	1,146.00	1,808.10	246.77	390.12

The successes achieved were possible due to the application of Soviet experience in constructing TES [thermal electric power stations] with single blocks of 200 to 500 megawatts and in the use of technical specifications for the production of turbine units with capacities of 500 and 200 megawatts (Poland), hydraulic machine units with a capacity of 178 megawatts (Hydro-electric Power Station Zheleznyye Vorota [GES] in Romania) and for the construction of electric power transmission lines of 400 and 750 kilovolts.

With the help of the USSR, units were incorporated into the following TES: in Bulgaria--Maritsa-Vostok III, Varna, Ruse, Burgas; in Hungary--Dunamenti imeni Gagarin; in the GDR--Boksberg, Enschwaldg, Hagenverder; in Poland--Kozienice, Huta Katowice; in Romania--(Braz)-2, (Mintiya-Deva), (Borzeshti), (Galats); in the CSSR--Prunerov; and others. Nuclear electric power stations (AES) were introduced in the GDR, Bulgaria, Hungary and the CSSR, and preparations are under way for the construction of the first AES in Cuba, Poland and Romania.

The formation of a general model for the future development of OES in CEMA member countries, including the corresponding cooperation with the Yugoslav power system, has made a large contribution to the many-sided interaction of fraternal countries. The model foresees a continuous increase in the technical level of the industry based on the construction of large-scale AES and TES as well as large-capacity electric power transmission lines.

Important are measures to improve the energy systems of CEMA member countries as outlined in the DTsPS for energy, fuel and raw materials. Among these measures are the accelerated growth of nuclear power, increased extraction and improved use of a country's own solid fuel resources (including low-calorie fuels) and the further development of the OES.

Accordingly, in European CEMA member countries and in the Republic of Cuba, construction of AES is planned with the technical assistance of the USSR and with a total capacity of 37 million kilowatts.

This decision is primarily related to limited supplies of organic fuels and also has to do with the high economic efficiency of AES under conditions of a substantially higher cost of traditional forms of energy.

As a result of the realization of the outlined programs in many CEMA member countries, the increase in energy consumption in the 1980's essentially will be provided for through nuclear energy, and in some of these countries, in the course of the next 10 to 15 years, it will become one of the most important sources of electric and thermal energy.

At the present time, with the technical assistance of the USSR on a bilateral basis, 11 energy blocks with VVER-440 reactors have been put into operation in fraternal countries, including 4 in Bulgaria, 1 in Hungary, 4 in the GDR and 2 in the CSSR. They provide the national economies of these countries with tens of billions of kilowatt-hours of electric power, which makes possible an annual saving of more than 10 million tons of standard fuel. Operation of these units has shown the high reliability of the equipment.

In the USSR in 1980, a VVER-1000 head reactor was put into operation at Novovorenezhskaya AES. Beginning in 1985, reactors of a similar type will be installed at a number of AES being built in CEMA member countries. The change to more powerful reactors will permit a more rapid increase in the energy potential of countries and a reduction of as much as 10 percent in the relative expenditure of metal for basic equipment and of 8 percent in fuel.

A fundamentally new direction in the use of nuclear fuel is the centralized heating of large cities and industrial centers through the creation and incorporation of nuclear thermal electric power venters and nuclear heat-supply stations. This will contribute greatly in the reorganization of the fuel and energy balance of CEMA member countries and will provide for a large saving and substitution of organic fuel. The accelerated development of the new industry is guaranteed by the creation of up-to-date equipment for new power centers based on the Agreement on Multi-Lateral International Specialization and Cooperation in the Production and Reciprocal Delivery of AES Equipment for the Period 1981 through 1990, signed in 1979 by Bulgaria, Hungary, the GDR, Poland, Romania, the USSR, the CSSR and Yugoslavia. Heretofore, the world has not known such a large-scale agreement in international cooperation. And it is being put into effect successfully. In the countries participating in the agreement, based on USSR technical specifications, a good deal of work is being done to provide for the production and delivery of equipment in the agreed volume.

At this time, in accordance with the DTsPS and through the joint efforts of interested countries, the Khmel'nitskaya and Yuzhnoukrainskaya AES are being built on USSR territory, each with a capacity of 4 million kilowatts. Half of the electric power produced at the Khmel'nitskaya AES (12 billion kilowatt-hours) will be exported to participating countries (Hungary, Poland and the CSSR) in their proportion share. For this purpose, a 750-kilovolt electric power transmission line is being constructed from the Khmel'nitskaya AES to Zheshuv (Poland), a distance of 390 km.

Romania will be provided 5 billion kilowatt-hours of electric power from the Yuzhnoukrainakaya AES in accordance with its proportional share in the 750-kilovolt transmission line from the Yuzhnoukrainskaya AES to Ksakcha (Romania), for which project planning is now under way. Based on a trilateral agreement between the USSR, Romania and Bulgaria, the line will be extended to Cobrudzha Substation (Bulgaria), which will strengthen the USSR's intersystem connections with Bulgaria.

Powerful 750-kilovolt power transmission lines will significantly increase the dependability of the parallel of the OES and will permit a more complete implementation of the intersystem measures by coordinating schedules for electric load and capacity reserves.

In the current decade, as before, the production of electric power in CEMA member countries will essentially utilize TES. The USSR continues to provide technical assistance to fraternal countries by participating in project planning and by delivering turbine units with capacities of 200 and 500 megawatts as well as other equipment.

An important direction in cooperation is that of increasing the utilization of the hydro-electric power potential of countries. Particular attention will be directed to the use of installations for meeting peak loads. For this purpose, in most GES as well as in the upper sections of their cascades, the construction of reservoirs is planned for the seasonal and daily regulation of the water flow. At new and already constructed GES, where expedient, it is planned to install additional turbines and reversible units (establishment of GES-GAES [Hydro Power And Water Storage Electric Power Stations]). All of this will permit increased efficiency in the use of hydroelectric installations.

At the present time, CEMA member countries have begun to develop plans for utilizing the potential of small rivers. On the basis of specialization and cooperation, it is planned to organize cooperation in the production of equipment for small, micro- and mobile GES.

Scientific research and planning work remain a most important direction in multilateral cooperation. The goal of this work is the further development of the OES, improving the exploitation of generating installations and electric power networks and an increase in the dependability of the electric power supply of consumers.

Interaction in this area allows fraternal countries to obtain not only a tangible economic effect through the efficient use of material, labor and financial resources, but also to improve significantly the industry's technical and economic indicators and thereby the national economy as a whole.

The training of national personnel is very important today. In consideration of this, the USSR Ministry of Power and Electrification is organizing the training of specialists and workers of socialist countries, especially those from the Mongolian People's Republic, Cuba and Vietnam, both at enterprises in the USSR and at projects under construction or being operated with the technical assistance of the USSR abroad.

In the future, within the framework of scientific and technical cooperation, there are plans to study the complicated topics and cover all stages of research. Particular attention will be paid to implementation. Plans are for all work to be performed on a contractual basis.

In conforming to the General Agreement and Program for cooperation in the development and wide application of microprocessor technology in the national economies of CEMA member countries for the years 1982 through 1990, the commission will prepare technical requirements for automated equipment, system design and associated software for electric power stations and power systems.

Within the framework of the commission, work has also begun on a concept for the future development of a unified electric power supply system in CEMA member countries for the period up to the year 2000.

As in other areas, particular importance is being attached to measures to accelerate the development and to increase the efficiency of the economic system in Vietnam, Cuba and the Mongolian People's Republic.

In Cuba, for example, the large-scale TES Rente and Maximo Gomez have been built with the help of Soviet specialists. The network of 220-kilovolt electrical transmission lines has been expanded considerably. The construction of 400-kilovolt transmission lines is planned.

In the Mongolian People's Republic, construction of the TETs-3 [Thermal Electric Power Center] (148 megawatts) has been completed with the technical assistance of the USSR. And the first block of TETs-4 went into operation in Ulan-Bator. Under study within the framework of multi-lateral cooperation are the possibilities for the creation of a large-scale TES with 200-megawatt blocks that would make use of the Baga-Nurskoye Coal Field. A 220-kilovolt power transmission line was put into operation from the Gusinoozerskaya GRES [State Rayon Electric Power Station] in the USSR through Darkhan to Erdenet (Mongolian People's Republic). As a result, parallel service is being implemented between the Mongolian Energy System and the Unified Energy System of the USSR, and planned deliveries of electric power from the USSR to the Mongolian People's Republic are assured. Construction of a 110-kilovolt power transmission line is proceeding on a large scale.

In Vietnam, with the help of the USSR, the first section of the Falay TES was constructed with 100-megawatt units. Under construction is the Hoa Binh GES on the Black River, the largest GES in Southeast Asia, with a capacity of 1,920 megawatts. Also under construction are 220-kilovolt power transmission lines.

Extensive ties are being developed between the USSR and Yugoslavia. Constructed with the technical assistance of the USSR were the Gacko and Ugljevik Electric Power Stations with 300-megawatt blocks and the Kosovo, Obrenovac, Tuzla, Kostalac III, Plevle and Bitola Electric Power Stations with 200-megawatt blocks.

The experience of the cooperation of CEMA member countries in the area of electric power shows the tremendous vitality of socialist internationalism as well as the high efficiency and mutual advantage of solving fundamental national economic tasks together.

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